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# The quality of discharge summaries completed in the general paediatric wards at the Chris Hani Baragwanath Academic Hospital

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**Title Page**

# THE QUALITY OF DISCHARGE SUMMARIES COMPLETED IN THE GENERAL PAEDIATRIC WARDS AT THE CHRIS HANI BARAGWANATH ACADEMIC HOSPITAL.

Shire Singh

A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, in partial fulfilment of the requirements for the Degree Masters of Medicine.

**Declaration**

"I, Shire Karan Singh, declare that this Research Report is my own, unaided work. It is being submitted for the degree of Masters of Medicine, at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.

Signed

.....day of.....2017"

**Abstract**

**Background**: Hospital discharge summaries are deemed to be an essential part of the medical record in South Africa but a formal assessment of the quality of these summaries is rarely undertaken. At the Chris Hani Baragwanath Academic Hospital (CHBAH), medical admission notes (bedletters) are difficult to retrieve from the hospital archives and the discharge summary is often the only readily available medical record that documents details of the hospital admission.

**Objectives**: This study determined the proportion of discharge summaries that are appropriately completed for children admitted to the general paediatric wards at CHBAH in Soweto.

**Methods**: A retrospective review of discharge summaries completed for children admitted from 01 May to 31 July 2016 was undertaken. The completeness of the following demographic and clinical variables was assessed: patient identifiers, hospital outcome, HIV infection status, and anthropometric status. The documentation of correct ICD-10 codes was assessed in children who were diagnosed with any form of lower respiratory tract infection (LRTI), which is the commonest diagnosis recorded in hospitalised children at CHBAH.

**Results**: Discharge summaries were available for 1148 (78.3%) of 1466 children admitted during the study period. For completed discharge summaries, between 80.1% to 93.3% of patient identifiers and 91.4% of patient outcomes were appropriately completed. HIV-exposure was documented in 84.7% of summaries. The anthropometric parameters, including admission weight and length/height, and discharge weight, were appropriately completed in 91.4%, 70.9%, and 50.0% of summaries respectively. The ICD-10 code for children with LRTI was appropriately recorded by medical staff in 338 (67.2%) of 503 cases. ICD-10 codes and anthropometric parameters, which are important clinical parameters in the paediatric follow-up consultation, were both correctly recorded in only 21.6% of children who required follow-up clinical consultations at CHBAH.

**Conclusion**: Compared to similar studies, both the rate of completion and the quality of completed discharge summaries were modest in this tertiary academic teaching hospital. As discharge summaries are crucial medical documents, interventions to improve the completeness rate and quality of discharge summaries need to be developed.

## Dedication

I would like to dedicate this research report to my husband, Murray and our children, Zairah and Ben.

**Acknowledgements**

This study would not have been possible without the help of Dr Fatima Solomon and her team at the Respiratory and Meningeal Pathogens Research Unit.

I would like to thank my supervisors, Dr Ziyaad Dangor and Associate Prof Sanjay Lala for their assistance.

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## Preface

This research report has been compiled in the “submissible” format accepted by the Faculty of Health Sciences of the University of the Witwatersrand. A manuscript has been prepared for submission to the South African Medical Journal. The approved MMed protocol is attached to the prepared manuscript, with supplementary information. The manuscript had been prepared in accordance with the ‘Instructions to Authors’ of the South African Medical Journal.

A plagiarism report, compiled through TurnItIn, has a 4% similarity index, and my supervisors and I declare that there is no plagiarism. The plagiarism report highlights very commonly used words and short phrases.

# An evaluation of medical discharge summary quality from the general Paediatric wards at Chris Hani Baragwanath Academic Hospital.

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**Conflict of interest**: All authors have no conflicts of interest relevant to this article to disclose

## Introduction

The discharge summary is an important, but often overlooked, medical document containing vital information pertaining to the patient's most recent stay in hospital. Various medical authorities emphasise the importance of good quality discharge summaries [1, 2, 3].The discharge summary is regarded as 'an essential component of the health record' by the Health Professions Council of South Africa (HPCSA) [4]. Although there is no universally accepted discharge summary format, the most crucial components of the discharge summary include: the discharge diagnosis, treatment received in hospital, results of investigations, follow-up visits, and envisaged further management plans [5]. In paediatrics, accurate anthropometric data is also recorded on the discharge summary because growth monitoring is frequently used to monitor response to an illness or disease [6].

The availability of a discharge summary, with adequately recorded information, has demonstrable direct benefit for the patient. A recent United States study showed that interventions to improve the discharge summary quality directly contributed to faster recovery rates and lower hospital readmission rates for cardiac failure patients [7].

In South Africa, the discharge summary document is of vital importance to the patient and health care workers (both at the admitting hospital and associated referral clinics or hospitals) because it is often the only detailed record of a hospital admission. Notwithstanding the fact that the Department of Paediatrics at the Chris Hani Baragwanath Academic Hospital (CHBAH) is one of the largest paediatric facilities in Africa, paediatric admission files are extremely difficult to retrieve from the CHBAH record archive, in keeping with the situation at many other South African state hospitals [8, 9, 10]. In the present study, we therefore determined the quality of discharge summaries that were completed for general paediatric admissions at the CHBAH.

**Materials and Methods:**

A retrospective review of discharge summaries completed for children admitted to the general paediatric wards from 01 May to 31 July 2016 was undertaken. In the Department of Paediatrics at the CHBAH, the discharge summary is completed by hand, in triplicate, using a carbonated proforma template; one copy of the summary is filed in the patient-retained outpatient file, the second in the hospital archive, whilst the third is sent for capture into an electronic database maintained by the Respiratory and Meningeal Pathogens Research Unit (RMPRU). The majority of summaries are completed by interns and occasionally by medical students, medical officers and registrars. The paper based discharge summary was designed by clinicians to capture pertinent clinical information to this setting [see Supplementary Appendix].

Through active monitoring of the ward admission registers maintained by the nursing staff, the RMPRU is able to track all admissions to the general paediatric wards. Discharge summaries collected by RMPRU staff are then cross-checked with the ward admission registers, which record the names of the patient, age, gender, hospital number, date of admission, and date of discharge or death. This allows for missing, inaccurate or unfinished summaries to be completed or corrected by the RMPRU staff. Two physicians at the RMPRU also verify the ICD-10 against the code written by the doctor on the discharge summary and the preliminary admission diagnosis written in the nursing admission register. This system provides an opportunity to assess whether information is appropriately recorded on the discharge summary form. For missing discharge summaries, the RMPRU staff extracts available information from the admission registry, which includes the age of the child, diagnosis at time of admission and outcome of the hospitalization. This allows for the electronic capture of all admissions to the general paediatric wards at CHBAH.

On discharge summaries completed by the hospital staff, we determined whether information was appropriately completed/recorded in the following fields: (i) Patient identifiers (First name, Surname, Gender, Hospital number, and dates of birth, admission, and discharge or death); (ii) Outcome of hospitalisation; (iii) Details of doctor completing the summary (name, signature and date of completion of summary); (iv) HIV status (HIV exposure, and CD4 and Viral load results for infected children); anthropometric status (admission weight and length/height, presence of nutritional oedema, and discharge weight); (v) ICD-10 codes for children diagnosed with any form of lower respiratory tract infection (e.g. bronchopneumonia, bronchiolitis, lobar pneumonia, etc.); (vi) Follow-up requirement (either at CHBAH and/or at

other health facility); and (vii) reasons for follow-up at CHBAH. Criteria used to deem a field as appropriately completed were defined prior to the analysis. Briefly, for domains requiring alpha characters (for example, first name and surname), fields that were not filled in, illegible or indecipherable (i.e. not clear enough to be read by at least two of three observers) were regarded as missing or incomplete. For domains requiring numeric characters (such as hospital numbers, dates, and anthropometric measurements), fields that were not filled in, illegible or indecipherable were regarded as missing or incomplete. Hospital numbers were regarded as incomplete if a single digit was missing and anthropometric measurements were regarded as incomplete if not recorded to the first decimal point. For ICD-10 codes, we deemed any code representative of any form of lower respiratory tract infection (generally codes from J09 to J22) to be appropriately recorded if the written diagnosis was compatible with any form of lower respiratory tract infection (LRTI) and verified by RMPRU physicians (See Study Protocol under Supplementary Appendix).

Data analysis: All the study variables, as defined in the data collection sheet, are categorical (or nominal) variables. Frequency distributions were reported for all the study objectives. Potential relationships between categorical variables were analysed using contingency tables (either Fisher's exact or Chi-squared tests).

Ethical clearance: This study has been approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand (Ref No: M160920).

**Results**

During the three-month study period, the admission registers showed that 1466 children were admitted to the general paediatric wards at CHBAH. Of those, 1148 (78.3%) had a discharge summary available for entry into the database. This indicated that 21.7% of discharge summaries were either not completed or misfiled before capture into the database. Thus we determined whether information was appropriately recorded in 1148 records (Table and Supplementary Table). For patient identifiers and outcomes, 80.0-93.3% and 91.4% of fields were appropriately completed by the doctor completing the discharge summary, respectively. It was rare for the doctor to leave the patient name and surname domains blank (0.1%) but indecipherable or illegible handwriting accounted for 8.4% of instances where the name domains were not appropriately recorded. For the other domains, the reasons for incomplete information are detailed in the Supplementary appendix.

The HIV-exposure of the admitted children was documented for 84.7% of cases, including 58 (5.4%) of whom were HIV-infected. Among HIV-infected children, 89.7% had CD4+ lymphocyte counts and 87.9% HIV viral load measures completed. The anthropometric parameters were appropriately documented in 50.0% to 91.4% of summaries. The admission weight (91.4%) was more appropriately recorded than either the admission length/ height (70.9%; $p < 0.0001$) or discharge weight (50.0%; $p < 0.0001$). The ICD-10 code for children with LRTI was appropriately recorded in 338 of 503 (67.2%) cases.

The requirement for follow-up (either at CHBAH or at another health facility) was appropriately completed for 1065 (92.8%) of the 1148 admissions. For the 794 children who required follow-up at CHBAH, the reason for follow-up was stated in 721 (90.1%) children (Figure 1a). The main reasons for follow-up were: 602 (75.8%) children were scheduled for clinical assessment, 78 (9.8%) for evaluation of outstanding laboratory results, and 41 (5.2%) required repeat anthropometric measurement (usually a check for weight gain).

We further compared the rates of appropriately completed discharge summary fields by month to determine whether discharge summary quality improved as interns spend more time in the Department of Paediatrics. Although there were statistical differences in some parameters, we did not deem these to be of major clinical relevance because the quality of summaries did not consistently improve with time (Supplementary Table)

For the 334 children with LRTI who required further follow-up at CHBAH, we determined whether both their ICD-10 code and anthropometric fields (since these are critically important clinical parameters) were appropriately recorded on the summary. Incomplete or inappropriately recorded discharge weights (n=178; 53.3%) and ICD-10 codes (n=117; 35.0%) were the commonest domains that were poorly recorded. Overall, only 72 (21.6%) of 334 children with LRTI had both appropriately completed ICD-10 codes and anthropometric parameters (Figure 1b).

**Discussion**

In the present study, we found that discharge summaries are only completed for approximately four of every five children who are admitted to the general paediatric wards at the CHBAH, which is a national tertiary academic institution. This is of concern because discharge summaries are often the only record of a hospital admission that can be accessed readily. Furthermore, the rate of completed discharge summaries compares unfavourably to other studies where >99% of discharge summaries are completed in settings such as Australia and the United States of America [11, 12].To our knowledge, the completion rate of discharge summaries in South African state hospitals is not known but the poor rate of retrieval of hospital records (about 39% in district hospitals [8]) and acknowledgement of poor hospital record management systems [9, 10] make it likely that missing discharge summaries are an important problem in South Africa.

Regarding the documentation of patient identifiers in completed summaries, about 10% of summaries did not record the name of the patient completely, and about 20% did not record the child's date of birth. Thus, basic patient identifiers are unrecorded in an unacceptably high proportion of summaries. The rate of completion of other important medical information, such as anthropometric status and HIV status is lower, with the child's discharge weight only recorded in 50% of the summaries.

Our study suggests that ICD-10 codes are not accurately recorded in a substantial proportion of summaries. Notwithstanding that our analysis of ICD-10 coding was restricted to children hospitalised with any LRTI, an incomplete or incorrect code was detected in 32.8% of LRTI cases. Additionally, HIV-exposure and reasons for follow-up visits were not indicated in about 15% and 10% of summaries respectively. Taken together, our study suggests that just over one in five discharge summaries (21.6%) have appropriately recorded diagnostic and anthropometric information.

Noting that Section 10 of the National Health Act (2003) states, in part, that: "All healthcare providers must supply patients with discharge reports. At the bare minimum these should contain the following information: the health service rendered, the patient's prognosis and the need for follow-up treatment", we find that the completion rate of discharge summaries and the documentation of important medical information are much lower than desired. Based on findings from a prospective US-based study, which showed that measures to improve the discharge summary quality resulted in lower hospital re-admission rates [7], we speculate that

poorly completed discharge summaries compromise further clinical care and/or result in further unnecessary health care visits and/or costs in our setting.

A major limitation of the present study is that we were unable to verify the accuracy of the information in the discharge summary against a 'gold standard' because the retrieval of archived hospital records at the CHBAH (currently and at the time of the study) is very difficult. Nonetheless, we assessed the quality of the discharge summary because it is often the only readily available record of a hospital admission. We chose parameters such as patient identifiers and ICD-10 codes because the patient identifiers could be verified by checking against the nursing admission register and ICD-10 codes undergo verification at the RMPRU, which address some of the weaknesses of not having the admission notes available. Information from the paediatric discharge summaries have been abstracted into the RMPRU database for over a decade, and we were able to reliably assess the completion rate of paediatric discharge summaries at our institution. Had we compared the contents of the discharge summary against the actual admission notes, then it is likely that the percentage of discharge summaries containing appropriately recorded diagnostic information would be lower.

It is possible that completed discharge summaries were misfiled or lost before reaching the RMPRU database but we believe that this scenario is highly unlikely – the more probable explanation is that discharge summaries were not completed in the first instance. We speculate that the main reason for the relatively low rate of completion is because the discharge summaries require timeous preparation: the intern needs to complete the summary by the time the child leaves the ward [13]. Factors that aggravate this situation – for example, when the discharge is performed in haste to lessen the pressure on occupied hospital beds (the study period coincided with the period when hospital admission rates were at the highest and there is relatively high patient load at the CHBAH) – may have contributed to the low completion rates. [13]

There are several documented methods to improve discharge summary quality: educational training [14, 15, 16], the use of electronically-generated discharge summaries [12], the provision of incentives [17], and having more senior doctors complete the discharge summary [5]. The feasibility of these methods to improve discharge summary quality should be assessed, not only for the patient's benefit [18], but because good quality discharge summaries contribute essential information that are used for public health system operations in South Africa. For example, ICD-10 codes require accurate recording because hospitals will require accurate

diagnostic codes when purchasing services from the proposed National Health Authority (as envisaged in the proposed National Health Insurance ) [19]. In South African state hospitals, consideration should be given to establishing teams in the health facility that are dedicated to controlling the quality of the discharge summary and ensuring that ICD-10 coding is done in a standardised manner to provide more robust data.

In summary, although we cannot extrapolate our results to other institutions, the poor quality of completed discharge summaries is concerning; CHBAH is a central academic hospital and it is likely that the quality of discharge summaries may be worse in other state hospitals. Discharge summary quality assessments should be carried out regularly and further studies are needed to assess the effect of interventions to improve discharge summary quality and the impact of good quality discharge summaries on patient health and health system functions in South Africa.

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**Table:** Proportion of parameters that were complete and accurate in paediatric discharge summaries.

| Domain | Number (%) (total n = 1148) |
|---|---|
| **Patient identifiers** | |
| Name | 1050 (91.5) |
| Surname | 1042 (90.8) |
| Gender | 1071 (93.3) |
| Hospital number | 962 (83.8) |
| Date of Birth | 920 (80.1) |
| Date of admission | 963 (83.9) |
| Date of discharge | 933 (81.3) |
| Discharge outcome | 1049 (91.4) |
| | |
| **Doctor details** | |
| Name | 1124 (97.9) |
| Doctor's date | 1085 (94.5) |
| | |
| **HIV exposure** | 972 (84.7) |
| | |
| **Anthropometric parameters** | |
| Admission weight | 1049 (91.4) |
| Admission length/height | 814 (70.9) |
| Discharge weight | 575 (50.0) |
| Nutritional oedema | 1032 (89.9) |
| | |
| **Lower Respiratory Tract Infection (LRTI)** | 503 (43.8) |
| | |
| **Correct ICD-10 for LRTI** | 338 (67.2) |

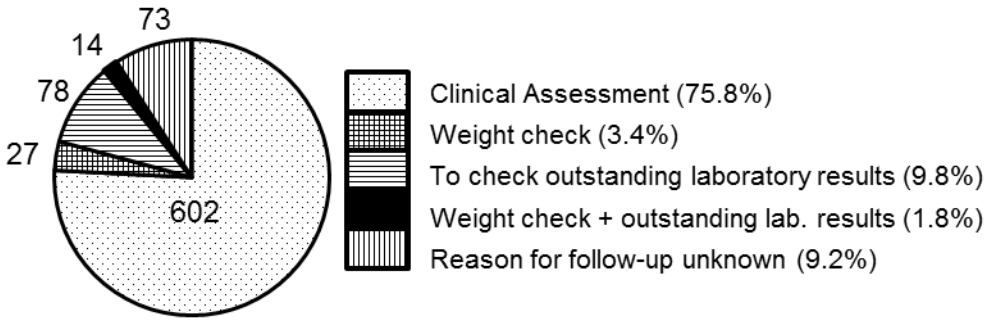



**Figure 1a. Reasons for paediatric follow-up at CHBAH following hospital discharge**

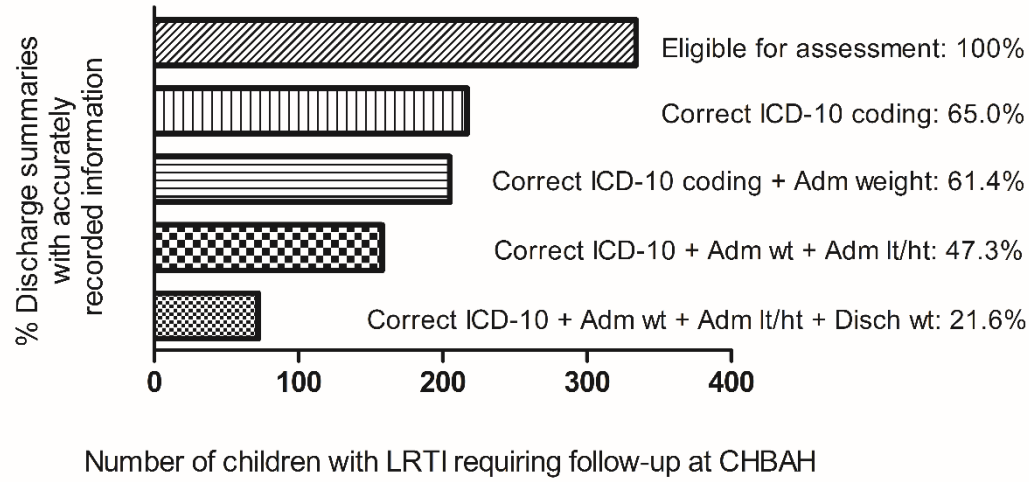



**Figure 1b. Percentage of discharge summaries, with accurately recorded ICD-10 codes and anthropometric parameters, which are completed for children with lower respiratory tract infections (LRTI)**

**Figure 1a. Reasons for paediatric follow-up at CHBAH following hospital discharge.**

**Figure 1b. Percentage of discharge summaries, with accurately recorded ICD 10 codes and anthropometric parameters, which are completed for children with lower respiratory tract infections (LRTI)**

**Supplementary Table.** Parameters used to assess the quality of completed discharge summaries in the Department of Paediatrics at Chris Hani Baragwanath Academic Hospital from 01 May 2016 to 31 July 2016

| Domain | May n=373(%) | June n=382(%) | July n=393(%) | Total n=1148(%) | *p-value |
|---|---|---|---|---|---|
| **Patient's name** | | | | | |
| 1 (present) | 334 (89.5) | 347 (90.8) | 369 (94) | 1050 (91.5) | 0.085 |
| 2 (illegible) | 5( 1.3) | 2 (0.5) | 0 | 7 (0.6) | |
| 3 (not filled in) | 0 | 1 (0.3) | 0 | 1 (0.09) | |
| 4 (indecipherable) | 34 (9.1) | 32 (8.4) | 24 (6) | 90 (7.8) | |
| **Patient's surname** | | | | | |
| 1 (present) | 332 (89.0) | 345 (90.3) | 365 (92.9) | 1042 (90.8) | 0.169 |
| 2 (illegible) | 7 (1.9) | 1 (0.3) | 0 | 8 (0.7) | |
| 3 (not filled in) | 0 | 0 | 1 (0.2) | 1 (0.09) | |
| 4 (indecipherable) | 34 (9.1) | 36 (9.4) | 27 (6.9) | 97 (8.4) | |
| **Gender** | | | | | |
| 1 (complete) | 353(94.6) | 360 (94.2) | 358 (91.1) | 1071 (93.3) | 0.097 |
| 2 (incomplete) | 20(5.4) | 22 (5.8) | 35 (8.9) | 77 (6.7) | |
| **Hospital number** | | | | | |
| 1 (correct) | 310 (83.1) | 318 (83.3) | 334 (85) | 962 (83.8) | 0.732 |
| 2 (illegible) | 21 (5.6) | 5 (1.3) | 1 (0.2) | 27 (2.4) | |
| 3 (not filled in) | 5 (1.3) | 0 | 5 (1.3) | 10 (0.9) | |
| 4 (indecipherable) | 28 (7.5) | 36 (9.4) | 34 (8.6) | 98 (8.5) | |
| 5 (incorrect) | 9 (2.4) | 23 (6) | 19 (4.8) | 51 (4.4) | |
| **Date of birth** | | | | | |
| 1 (complete) | 284 (76.1) | 304 (79.6) | 332 (84.6) | 920 (80.1) | 0.014 |
| 2 (illegible) | 13 (3.5) | 7 (1.8) | 2 (0.5) | 22 (1.9) | |
| 3 (not filled in) | 12 (3.3) | 7 (1.8) | 10 (2.5) | 29 (2.5) | |
| 4 (indecipherable) | 39 (10.4) | 31 (8.2) | 34 (8.6) | 104 (9.1) | |
| 5 (incorrect) | 25 (6.7) | 33 (8.6) | 15 (3.8) | 73 (6.4) | |
| **Date of admission** | | | | | |
| 1 (complete) | 306 (82) | 317 (83) | 340 (86.5) | 963 (83.9) | 0.204 |
| 2 (illegible) | 11 (3) | 8 (2) | 1 (0.2) | 20 (1.7) | |
| 3 (not filled in) | 3 (0.8) | 5 (1.3) | 3 (0.8) | 11 (1) | |
| 4 (indecipherable) | 37 (9.9) | 34 (9) | 35 (8.9) | 106 (9.2) | |
| 5 (incorrect) | 16 (4.3) | 18 (4.7) | 14 (3.6) | 48 (4.2) | |
| **Date of discharge** | | | | | |
| 1 (complete) | 294 (78.8) | 304 (79.6) | 335 (85.2) | 933 (81.3) | 0.044 |
| 2 (illegible) | 9 (2.4) | 6 (1.6) | 1 (0.2) | 16 (1.4) | |
| 3 (not filled in) | 28 (7.5) | 24 (6.3) | 21 (5.4) | 73 (6.3) | |
| 4 (indecipherable) | 29 (7.8) | 32 (8.4) | 31 (7.9) | 92 (8) | |
| 5 (incorrect) | 13 (3.5) | 16 (4.2) | 5 (1.3) | 34 (3) | |
| **Outcome** | | | | | |
| 1 (complete) | 334 (89.5) | 362 (94.8) | 353 (89.8) | 1049 (91.4) | 0.015 |
| 2 (incomplete) | 39 (10.5) | 20 (5.2) | 40 (10.2) | 99 (8.6) | |

| Domain | May n=373(%) | June n=382(%) | July n=393(%) | Total n=1148(%) | *p-value |
|---|---|---|---|---|---|
| **Doctor's name** | | | | | |
| 1 (complete) | 360 (96.5) | 377 (98.7) | 387 (98.5) | 1124 (97.9) | 0.071 |
| 2 (illegible) | 2 (5.4) | 0 | 1 (0.2) | 3 (0.3) | |
| 3 (not filled in) | 7 (1.9) | 5 (1.3) | 3 (0.8) | 15 (1.3) | |
| 4 (indecipherable) | 4 (1.1) | 0 | 2 (0.5) | 6 (0.5) | |
| **Doctor's signature** | | | | | |
| 1 (present) | 363 (97.3) | 375 (98.2) | 389 (99) | 1127 (98.2) | 0.226 |
| 2 (absent) | 10 (2.7) | 7 (1.8) | 4 (1) | 21 (1.8) | |
| **Doctor's date** | | | | | |
| 1 (complete) | 352 (94.4) | 363 (95) | 370 (94.2) | 1085 (94.5) | 0.856 |
| 2 (illegible) | 1 (0.3) | 3 (0.8) | 1 (0.2) | 5 (0.4) | |
| 3 (not filled in) | 20 (5.3) | 15 (3.9) | 20 (5.1) | 55 (4.8) | |
| 4 (indecipherable) | 0 | 0 | 2 (0.5) | 2 (0.2) | |
| 5 (incorrect) | 0 | 1 (0.3) | 0 | 1 (0.09) | |
| **Hospital unit** | | | | | |
| 1 (recorded) | 321 (86.1) | 345 (90.3) | 368 (93.7) | 1034 (90) | 0.002 |
| 2 (not recorded) | 52 (13.9) | 37 (9.7) | 25 (6.4) | 114 (10) | |
| **HIV exposure** | | | | | |
| 1 (recorded) | 293 (78.5) | 326 (85.3) | 353 (89.8) | 972 (84.7) | <0.001 |
| 2 (not recorded) | 80 (21.5) | 56 (14.7) | 39 (10) | 174 (15.2) | |
| 3 (indecipherable) | 0 | 0 | 1 (0.2) | 1 (0.09) | |
| **HIV Elisa** | | | | | |
| 1 (recorded) | 195 (52.3) | 223 (58.4) | 271 (69) | 689 (60) | <0.001 |
| 2 (not recorded) | 178 (47.7) | 159 (41.6) | 121 (30.8) | 457 (39.8) | |
| 3 (indecipherable) | 0 | 0 | 1 (0.2) | 1 (0.09) | |
| **HIV PCR** | | | | | |
| 1 (recorded) | 89 (23.9) | 142 (37.2) | 152 (38.7) | 383 (33.4) | <0.001 |
| 2 (not recorded) | 284 (76.1) | 240 (62.8) | 240 (61.1) | 763 (66.5) | |
| 3 (indecipherable) | 0 | 0 | 1 (0.2) | 1 (0.09) | |
| **CD4 count** | | | | | |
| 1 (recorded) | 21 (5.6) | 18 (4.7) | 13 (3.3) | 52 (4.5) | 0.297 |
| 2 (not recorded) | 352 (94.4) | 364 (95.3) | 379 (96.5) | 1094 (95.3) | |
| 3 (indecipherable) | 0 | 0 | 1 (0.2) | 1 (0.09) | |
| **Viral Load** | | | | | |
| 1 (recorded) | 21 (5.6) | 19 (5) | 11 (2.8) | 51 (4.4) | 0.136 |
| 2 (not recorded) | 352 (94.4) | 363 (95) | 381 (97) | 1095 (95.5) | |
| 3 (indecipherable) | 0 | 0 | 1 (0.2) | 1 (0.09) | |

| Domain | May n=373(%) | June n=382(%) | July n=393(%) | Total n=1148(%) | *p-value |
|---|---|---|---|---|---|
| | | | | | |
| **Admission weight** | | | | | |
| 1 (accurate) | 343 (92) | 353 (92.4) | 353 (89.8) | 1049 (91.4) | 0.390 |
| 2 (no decimal) | 18 (4.8) | 18 (4.7) | 32 (8.2) | 68 (5.9) | |
| 3 (indecipherable) | 2 (0.5) | 0 | 0 | 2 (0.2) | |
| 4 (not recorded) | 10 (2.7) | 10 (2.6) | 8 (2) | 28 (2.4) | |
| 5 (incorrect) | 0 | 1 (0.3) | 0 | 1 (0.09) | |
| **Discharge weight** | | | | | |
| 1 (accurate) | 176 (47.2) | 193 (50.5) | 206 (52.5) | 575 (50) | 0.343 |
| 2 (no decimal) | 8 (2) | 11 (2.9) | 19 (4.8) | 38 (3.3) | |
| 3 (indecipherable) | 3 (0.8) | 0 | 0 | 3 (0.3) | |
| 4 (not recorded) | 186 (50) | 177 (46.3) | 167 (42.5) | 530 (46.2) | |
| 5 (incorrect) | 0 | 1 (0.3) | 1 (0.2) | 2 (0.2) | |
| **Admission length/height** | | | | | |
| 1 (accurate) | 279 (74.8) | 277 (72.5) | 258 (65.6) | 814 (70.9) | 0.014 |
| 2 (no decimal) | 36 (9.7) | 43 (11.2) | 69 (17.7) | 148 (12.9) | |
| 3 (indecipherable) | 0 | 0 | 0 | 0 | |
| 4 (not recorded) | 56 (15) | 61 (16) | 65 (16.5) | 182 (15.9) | |
| 5 (incorrect) | 2 (0.5) | 1 (0.3) | 1 (0.2) | 4 (0.35) | |
| **Nutritional oedema** | | | | | |
| 1 (recorded) | 327 (87.7) | 345 (90.3) | 360 (91.6) | 1032 (89.9) | 0.185 |
| 2 (not recorded) | 46 (12.3) | 37 (9.7) | 33 (8.4) | 116 (10.1) | |
| **LRTI diagnosis** | | | | | |
| 1 (yes) | 171 (45.8) | 191 (50) | 141 (35.9) | 503 (43.8) | <0.001 |
| 2 (no) | 202 (54.2) | 191 (50) | 252 (64.1) | 645 (56.2) | |
| 3 (illegible) | 0 | 0 | 0 | 0 | |
| 4(indecipherable) | 0 | 0 | 0 | 0 | |
| **Correct ICD-10 code** | | | | | |
| 0 (NA) | 201 (53.9) | 190 (49.7) | 251 (63.9) | 645 (56.2) | 0.468 |
| 1 (yes) | 118 (31.6) | 131 (34.3) | 89 (22.6) | 338 (29.4) | |
| 2 (no) | 16 (4.3) | 7 (1.9) | 3 (0.8) | 26 (2.3) | |
| 3 (illegible) | 0 | 0 | 0 | 0 | |
| 4 (not filled in) | 38 (10.2) | 54 (14.1) | 50 (12.7) | 139 (12.1) | |
| **Follow-up at CHBAH** | | | | | |
| 1 (yes) | 269 (72.2) | 238 (62.3) | 287 (73) | 794 (69.2) | 0.002 |
| 2 (no) | 71 (19) | 108 (47.1) | 89 (22.7) | 268 (23.3) | |
| 3 (not recorded) | 33 (8.8) | 36 (9.4) | 17 (4.3) | 86 (7.5) | |
| **Follow -up other facility** | | | | | |
| 1 (yes) | 54 (14.5) | 96 (25.1) | 83 (21.1) | 233 (20.3) | 0.001 |
| 2 (no) | 67 (18) | 39 (10.2) | 65 (16.5) | 171 (14.9) | |
| 3 (not recorded) | 252 (67.5) | 247 (64.7) | 245 (62.3) | 744 (64.8) | |

* p value comparing proportion of entries for May, June and July, using the Chi squared or Fisher's exact test.

*** Please write L E G I B L Y; Complete all details in blocks; Write follow-up plans with clear instructions ***

Good discharge summaries save lives!

# Discharge Summary: Department of Paediatrics, Chris Hani Baragwanath Academic Hospital

Hospital number: G

**Unit:** (Please circle) 1 2 3 4 Ward 39 Other: ____

Patient— First name:

Patient— Surname:

Date of birth: Day Month Year

Age: Days / Weeks / Months / Years

Gender: Male Female

Date of admission: Day Month Year

Date of Discharge/ Death: Day Month Year

## Nutritional Status:

Admission weight: . kg

Discharge weight: . kg

Admission length/ height: . cm

Nutritional Oedema*: Yes No

Oedema seen in kwashiorkor

**Outcome:** (Fill number in box)
1 = Discharged home
2 = Transferred to Selby
3 = Transferred to other hospital
4 = Refused treatment
5 = Death in hospital

Previous admission(s)? (Please circle) Yes No
(If yes, no. of admissions: ____ )
Care in ICU/ 36B this admission? Yes No
Ventilated/ Resus this admission? Yes No

Follow-up clinic appointments:
1. _____ clinic
Day Month Year
2. _____ clinic
Day Month Year

Culture-confirmed infectious disease: Yes No

Organism isolated from: (Write number in box below ↓ - leave boxes blank if all cultures negative)
1=E Coli; 2=S Aureus; 3=S Pneum; 4=H Influ; 5=K Pneum; 6=Staph spp; 7=Pseudomonas spp; 8=Cryptococcus spp 9=GBS 10=Other

Blood organism #1
Blood organism #2
Urine organism #1
Urine organism #2
CSF organism #1
CSF organism #2
Other site organism #1
Other Site organism #2
•>2 organisms identified on cultures: Yes

Discharge Diagnosis: (State **most specific** and relevant diagnoses first)

1: _____

2: _____

3: _____

Major Chronic Conditions:

1: _____

2: _____

ICD-10 code

Office Use

**Clinical notes:** Summary of presenting illness:

_____

_____

_____

_____

Main clinical findings: _____

_____

_____

_____

Progress in ward: _____

_____

_____

Procedures/ Investigations (List test e.g. CXR, Echo, U/S, CT scan; date done & main findings):

_____

_____

_____

**Lab tests:**

FBC (adm): _____

UE (adm): _____

Bili (T/D): ___ / ___ T Prot/Alb: ___ / ___ ALP/ GGT: ___ / ___ ALT/AST: ___ /___

_____

_____

_____

_____

_____

Pending results (State lab ref no.): _____

_____

**HIV status and TB status:** (Please circle)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| • Mom PMTCT: | Yes | No | Unk | • Child PMTCT: | Yes | No | Unk |
| • HIV Exposure: | Yes | No | Unk | • Current ARV Rx: | Yes | No | Unk |
| • HIV Elisa: | Pos | Neg | Unk | • Current TB Rx: | Yes | No | Unk |
| • HIV PCR: | Pos | Neg | Unk | • Previous TB Rx: | Yes | No | Unk |
| •Defaulted ARV: | Yes | No | Unk | •Defaulted TB Rx: | Yes | No | Unk |

CD4+ (Abs count/%): ____ / ____ (%) Date: _____

HIV Viral load: _____ Date: _____

**Medication given to patient during hospitalisation** (List most important drugs first):

1. _____ 4. _____ 7. _____
2. _____ 5. _____ 8. _____
3. _____ 6. _____ 9. _____

**TTO medication** (List drugs without doses; if >6 drugs state most important drugs first. All drugs with doses to be written in OPD file):

1. _____ 3. _____ 5. _____
2. _____ 4. _____ 6. _____

**Follow-up instructions** (Be specific please!): _____

_____

_____

**Caregiver/ Parent name:** _____ **Contact no.:**

Doctor's name: _____ _____ _____

Please print name legibly | Signature | Date



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R14/49 Dr Shire Singh et al

# HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

## CLEARANCE CERTIFICATE NO. M160920

**NAME:** Dr Shire Singh et al
**(Principal Investigator)**
**DEPARTMENT:** Paediatrics
Respiratory and Meningeal Pathogens Research Unit
Chris Hani Baragwanath Academic Hospital

**PROJECT TITLE:** The Quality of Discharge Summaries Completed in the General Paediatric Wards at the Chris Hani Baragwanath Academic Hospital

**DATE CONSIDERED:** 30/09/2016

**DECISION:** Approved unconditionally

**CONDITIONS:**

**SUPERVISOR:** Prof Sanjay Lala

**APPROVED BY:** _____
Professor P Cleaton-Jones, Chairperson, HREC (Medical)

**DATE OF APPROVAL:** 17/10/2016

**This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.**

**DECLARATION OF INVESTIGATORS**

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 10004, 10th floor, Senate House/3rd Floor, Phillip Tobias Building, Parktown, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in September and will therefore be due in the month of September each year.

_____ _____
Principal Investigator Signature Date

**PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES**

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# MMed research protocol

Title: The quality of discharge summaries completed in the general paediatric wards at the Chris Hani Baragwanath Academic Hospital.

Investigator: Dr Shire Singh (student no 9401366K)

Supervisors: Prof Sanjay G Lala , MBBCh, FCPaed, PhD

Dr Ziyaad Dangor, MBBCh, FCPaed, PhD

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## A. Introduction

The discharge summary is an important document that holds vital, information pertaining to the patient's most recent stay in hospital.

Various clinical bodies have developed guidelines to ensure good quality discharge summaries [1,2,3]. The discharge summary is regarded as 'an essential component of the health record' by the Health Professions Council of South Africa (HPCSA) [Booklet 14] but the HPCSA do not provide additional specific information about discharge summaries. Booklets published by the HPCSA give basic guidelines only, when referring to patient records, Booklet 14 mentions discharge summaries in a few words only. Section 10 of the National Health Act 2003, states that "All healthcare providers must supply patients with discharge reports. At the bare minimum these should contain the following information: The health service rendered, the patient's prognosis and the need for follow-up treatment. It is also advisable to include information about medication and any relevant warnings and/or advice for the patient and /or the patient's GP."

The discharge summary may take the form of a structured letter, standardised sheet or table. Each design is an in-house decision. Most discharge summaries are paper based (either hand written or printed summaries) or electronic discharge summaries.

<u>Value of a discharge summary:</u>

A well written discharge summary is important for a number of reasons, one of which is in the transfer of patient information and transition of care, from in-hospital clinicians to primary care physicians. The receiving primary care physician depends on the discharge summary to provide all the information required to manage the patient appropriately, and make informed decisions based on the details supplied in the discharge summary. Secondly, there is prevention of unnecessary admissions when a well written discharge summary is presented. Appropriate information is necessary to prevent confusion after a patient has been discharged from hospital. In saying this, it was found that 28% of readmissions within 30 days were avoidable, had the discharge summary been completed accurately [6]. The discharge summary is also an important source of information for the patient and the family, to provide explanations on their illness, the management thereof, including follow-up and medication. Adverse events are common in recently discharged patients due to incomplete

medication information [7]. A number of readmissions were also likely linked to the fact that patients were not aware of medication changes, omissions and substitutions made while in hospital. The discharge summary is a permanent record of the patient's hospital stay and is important for both the patient and the physician, as it should streamline continuation of care.

Components of a discharge summary:

Although there is debate as to what information is required to make a discharge summary complete and accurate, a recent systematic review suggests that the most crucial components of a discharge summary include: discharge diagnosis, treatment received in hospital, results of investigations, and follow-up required [5]. Although this review did not rate patient information and contact details as essential components of the summary, a separate systematic review found that patient identification and the contact information of the doctor (for follow-up) were as essential as the patient's diagnosis, problem list, medication list, and a list of laboratory results [8]. The importance of various components of a discharge summary may also vary according to the seniority and experience of the medical staff: for example, junior doctors believe that diagnoses, patient and medication details are the three most important points to be included in a discharge summary [8]. Senior clinicians expect the following information to appear on the discharge summary; diagnosis, problem list, medication list, identification and contact information of the co-ordinating physician, the cognitive status of the patient and a list of results [8].

Quality of discharge summaries

Discharge summaries are often incomplete and many factors influence the quality of a completed discharge summary [10]. For example, patients' medication is better documented on electronic discharge summaries that are linked to an electronic medication management system although there appear to be no other significant differences between paper and electronic discharge summaries with regard to accuracy and completeness [4].

According to senior clinicians and consultants, the clinical experience of the author of the discharge summary will be reflected in a well written, and concise yet complete discharge summary [8]. This may be a conundrum since junior staff, who have the least clinical experience, complete most of the discharge summaries. In particular, junior staff underestimate the importance of pending laboratory tests - one study found that primary care physicians were uninformed of 62% of pending laboratory tests on patients who were

referred to them for further care post hospital discharge [9]. The question then arises as to why some discharge summaries are poorly written, while others are relevant and accurate. There may be numerous reasons for this discrepancy including, increased workload, high turnover of patients, shortage of staff, and a busy unit; indeed, a significant improvement in the quality of discharge summaries written by residents is noted when the work load was reduced [10]. The quality of the discharge summary is improved when the author is familiar with the patient's care and management since admission and when the author has knowledge of the intended recipient of the discharge summary i.e. general practitioner or other hospital specialist – this lends a certain nuance to the way in which the discharge summary is written.

Interventions to improve quality of discharge summaries

Various interventions, across numerous hospitals, have been employed to improve the quality of discharge summaries [11]. Interventions to improve the quality of discharge summaries included: education, feedback and incentives. Generally, the writing of discharge summaries is not part of the medical curriculum, but lectures on writing of discharge summaries did improve the quality of the discharge summary [5]. Individual doctors were given a grade on their discharge summary pre- and post-intervention, and doctors made an overall improvement of 30% on the completeness and accuracy of their discharge summaries. They were also given fortnightly feedback on their discharge summaries, which helped encourage ongoing improvement. The introduction of a discharge summary template helped with inclusion of data [12]. Most hospitals, however do make use of a template, to standardise the writing of discharge summaries. It has also been recognised that non-financial incentives, such as the issue of coffee vouchers, help improve the quality of discharge summaries [12]. Providing encouragement to junior staff, whilst ignoring minor errors, facilitated suggestions from the junior staff on how they could improve the quality of the discharge summary [12]. Another interesting fact was that, in some hospitals, where discharge summaries are dictated, it was found that, having to think while dictating the discharge summary, improved the quality of the discharge summary notably [4]. Education on discharge summaries improved the score system implemented to gauge improvement of the discharge summary [12]. So, therefore, it may be indicated, that the writing of discharge summaries be included in the medical curriculum.

General information about the discharge summaries completed for children admitted to the general paediatric wards at the CHBAH

The vast majority of children admitted to the paediatric wards at CHBAH come from low-income households and will most likely access public health facilities in South Africa. This discharge summary is therefore not addressed to a specific health professional in most cases but is intended to provide a concise summary of the pertinent features of the current hospital admission; this information is generally written for any health professional who may care for the child in the future.

At the Chris Hani Baragwanath Academic Hospital (CHBAH), the discharge summaries are almost always completed by interns and medical officers using a pre-printed discharge summary template (see appendix). The discharge summary is completed in triplicate: one copy is filed with the hospital records, the second is given to the child's parent or caregiver, whilst the third copy is collected from each ward by staff members working at the Respiratory and Meningeal Pathogens Research Unit (RMPRU). In general, since 2014 the RMPRU uses the discharge summary to monitor the incidence of vaccine-preventable infections in children residing in Soweto. Information about previous or current HIV infection and tuberculosis is also recorded on the discharge summary. At the RMPRU, information from the discharge summary is abstracted into an electronic database. Where possible, an effort is made by the RMPRU staff to obtain missing information from source documents; the missing information retrieved by the RMPRU staff is easily identified on the discharge summary form.

Although the discharge summary has been an essential part of the child's clinical records since the establishment of the Department of Paediatrics about 60 years ago, an assessment of the completeness and quality of the discharge summaries had not been formally undertaken or reported on (to the best of our knowledge). Our anecdotal experience, based on the review of recently hospitalised children at follow-up or outpatient clinics, suggests that about 20-25% of discharge summaries are so poorly written that they impact on the further clinical care of the child. On occasion, a discharge summary cannot be located in the outpatient clinical record.

In the present study, I plan to analyse specific components of the paediatric discharge summary that will provide further information on the completeness and quality of the discharge summary. The information gathered from the present study may highlight areas of

concern regarding the completion of the discharge summary; feedback will be provided to the Department of Paediatrics and Child Health at CHBAH and the results of this study may be used as a basis to plan further interventions that improve the quality of the discharge summary.

**B. Study Objectives:**

1.1) To assess the completeness of paediatric discharge summaries, which are completed by doctors (including student interns) working in the general paediatric wards at the Chris Hani Baragwanath Academic Hospital (CHBAH), in four domains:

i) Patient identifiers and outcomes;
ii) Details of the doctor completing the summary;
iii) HIV Status of the child; and
iv) Anthropometrical status of the child.

1.2) To determine the proportion of in-patients, admitted to the general paediatric wards, whose discharge summary information is entered into a central computerised database.

2) To assess the correlation of appropriate ICD-10 coding in children who are diagnosed with lower respiratory tract infection.

3) To determine the percentage of in- patients that have scheduled follow-up appointments at the Chris Hani Baragwanath Academic Hospital and/or other healthcare facilities, and to document the reasons for patient follow-up.

**C. Methods:**

**a)Study design:**

Retrospective review of inpatient paediatric discharge summaries.

**b) Sites of study:**

Respiratory and Meningeal Pathogens Research Unit (RMPRU) office, 12th floor, Nurses Residence, and the General Paediatric wards at the CHBAH (i.e. Wards 17, 18, 19 and 33).

**c) Study material:**

All handwritten discharge summaries for children admitted to the general paediatric wards from May, June and July 2016. Discharge summaries are written by ward doctors and student interns; summaries are collected by RMPRU staff for entry into the central database. The ward registers located in the general paediatric wards at the CHBAH (i.e. Wards 17, 18, 19 and 33) will be used to determine the number of children admitted to the general paediatric wards over the study period.

**d) Sampling:**

Sample size including statistical rationale: All handwritten discharge summaries for children discharged from the general paediatric wards in May and June 2016. In these months there is generally a peak in the number of admissions likely due to RSV (respiratory syncytial virus), therefore increasing the number of children with a lower respiratory tract infection diagnosis. Approximately 500 admissions for each month is anticipated, making a total of 1000 discharge summaries for review.

**e) Inclusion and exclusion criteria:**

Inclusion:

All handwritten discharge summaries written for children discharged from the general paediatric wards; this includes summaries written for patients that have died in the ward.

Exclusion:

1) Discharge summaries primarily written by RMPRU staff; this happens when a discharge summary cannot be located (either not prepared by the ward doctors or lost or not forwarded

to the RMPRU).Discharge summaries may not be prepared if a patient is discharged over the weekend or public holidays.

2) Discharge summaries written for the paediatric short stay ward (i.e. Ward 39) will not be analysed in the study.

**f)Study definitions:**

OBJECTIVE 1

This objective assesses the completeness of the discharge summaries.

The following categorical variables will be collected:

A. Patient Identifiers and Outcome:

a) The following fields: first name, surname, gender, and outcome, will be examined and coded as 'complete' or 'incomplete'. Any field coded as ' incomplete' will indicate:

i) Illegible handwriting (in cases of doubtful handwriting 2 of 3 independent reviewers need to categorise handwriting as illegible), minor spelling errors will be ignored.

ii) Fields not filled in

iii) Indecipherable hand writing (light ink on copy).

b) The field 'hospital number' will be examined and coded as 'correct' or 'incorrect' .To be coded as 'incorrect' will indicate:

i) Any one of the eight numerical digits are missing

ii) More than eight numerical digits are present.

c) Date fields such as: date of birth, date of admission and date of discharge will be examined and coded as 'complete' or 'incomplete'. To be coded as 'incomplete' will indicate:

i) Any one of the day, month or year fields are incomplete, incorrect, missing, illegible or indecipherable.

B. Details of the doctor (including medical students) completing summary:

a) Doctor's name will be examined and coded as 'complete' or 'incomplete'. To be coded as 'incomplete' will indicate:

i) Illegible handwriting ( in cases of doubtful handwriting 2 of 3 independent reviewers need to categorise handwriting as illegible), minor spelling errors will be ignored

ii) Fields not filled in

iii) Indecipherable hand writing (light ink on copy).

b) Doctor's signature will be examined and coded as 'present' or 'absent'.

c) Date will be examined and coded as 'complete' or 'incomplete'. To be coded as 'incomplete' will indicate:

i) Any one of the day, month or year fields are incomplete, missing or illegible.

d) Hospital unit will be examined and coded as 'recorded' or 'not recorded'.

C. HIV status of the child:

In this field, the following will be examined: HIV exposure, HIV Elisa result, HIV PCR result, CD4 count and HIV viral load. Each will be coded as 'recorded' or 'not recorded'. To be coded as 'not recorded' will indicate:

i) Fields not filled in

ii) Indecipherable hand writing (light ink on copy).

D. Anthropometric status:

a) In this field, the following will be examined: admission weight, discharge weight, admission length/height, these fields will be coded as 'accurate', 'recorded imprecisely' or 'not recorded'. 'Accurate' will indicate documentation of the first numerical digit after the decimal point.

'Recorded imprecisely' will indicate:

i) Illegible handwriting (in cases of doubtful handwriting 2 of 3 independent reviewers need to categorise handwriting as illegible), minor spelling errors will be ignored

ii)Omission of the first numerical digit after decimal the point for both height and weight

iii) Indecipherable hand writing (light ink on copy).

b) The field 'nutritional oedema' will also be examined and coded as' recorded' or 'not recorded.

OBJECTIVE 1.2

The number of children admitted to the general paediatric wards will be determined by reviewing the admissions register for ward 36. This is because all admitted children are initially managed in ward 36 before transfer to a general paediatric ward. Thus the ward 36 admissions register is a record of all children admitted to the general paediatric ward. Occasionally, some children who are eventually admitted to the general paediatric ward, were initially admitted directly to the main intensive care unit (MICU) or to the paediatric surgical ward. The MICU is an independent unit and not formally part of the paediatric department at CHBAH. In the case of direct MICU admissions, these children are either discharged directly back to the referring hospital (in which case they do not account for any paediatric admissions) or transferred to the admission ward (i.e. ward 36) before transfer to a general paediatric ward. In the latter case, the admission is recorded in the ward 36admissions register. If children are transferred from the paediatric surgical ward to a general paediatric ward, then this admission is recorded in the general paediatric ward register. Thus through monitoring of the ward registers in ward 36 and the general paediatric wards, the central registration office at RMPRU is able to accurately determine the total number of admissions to the general paediatric wards.

OBJECTIVE 2:

The accuracy of ICD-10 coding for any lower respiratory tract infection (LRTI) will be assessed. In the general paediatric wards at CHBAH, LRTI is the commonest diagnosis recorded for admitted children. For the purposes of this study, any of the following will all be

regarded as a diagnosis of a lower respiratory tract infection: pulmonary tuberculosis which may be congenital or acquired, culture proven or not, pertussis, pneumonia/pneumonitis caused by any infective agent which may be specified or unspecified, pneumonia of any part of the lung(bronchopneumonia, lobar pneumonia), pneumonia/pneumonitis due to aspiration of any solids or liquids, bronchiolitis, bronchiectasis, lung and/or mediastinal abscess, pyothorax, pleuritis and pleural effusion.

The following are categorical variables and will be examined as the fields: 'Lower Respiratory Tract Infection' and 'Correct ICD-10 code for LRTI'. These will be coded as 'yes', 'no' or 'unknown'. To be coded as 'yes', the first numerical digit after the decimal point will not be essential. To be coded as 'unknown' will indicate:

i) Illegible handwriting ( in cases of doubtful handwriting 2 of 3 independent reviewers need to categorise handwriting as illegible), minor spelling errors will be ignored

ii) Indecipherable hand writing (light ink on copy).

OBJECTIVE THREE:

The number of patients called back for follow-up will be assessed. Further, the place of follow-up, be it CHBAH or any other health facility will be reviewed and the possible reasons for follow-up at CHBAH, cited on the discharge summary will be reviewed with an aim to establish if the follow-up was appropriate. The following categorical variables will be collected, these fields include:

a. Follow-up appointment at CHBAH, which will be coded as 'yes', 'no' or 'not recorded'.
b. Follow-up appointment at other health facility, which will be coded as 'yes' or 'no'.
c. Reason for follow-up appointment at CHBAH
    a. For clinical assessment, specialised radiological or other investigative tests (e.g. EEG, Cardiac echocardiogram, etc.), or treatment (irrespective of any other reason for follow-up)
    b. For weight check only
    c. For laboratory result only

d. For weight check and laboratory result only

e. Reason not documented/ unclear/ illegible or indecipherable.

**g) Data collection:**

Carbon copies of the discharge summaries written by ward doctors for children from the general paediatric wards, collected by RMPRU staff for entry into the centralised database, will be manually examined, and the relevant data recorded, on the data collection form (see appendix). Each data collection form will have a corresponding coded number for the corresponding carbon copy of the discharge summary. The aim of which is to have the ability to re-check any questionable data. The data will be abstracted into an electronic database(Microsoft Excel).

**h)Source of Bias:**

This is a retrospective analysis and data may be missing, as discharge summaries do get lost or may not be written at all. The decision not to include such summaries in the study may influence the data. There may also be bias in manually reviewing the discharge summaries, as copies may be faded and handwriting illegible to one observer and options marked may appear ambiguous, which may influence how the information on the summary is interpreted. To account for the amount of paediatric clinical experience acquired by the interns (i.e. new versus experienced interns), discharge summaries will be compared for the months of May (when interns begin their paediatric rotation) and July ('experienced' interns) to assess if any improvement in the discharge summaries occur.

**D. Data analysis**

All the study variables, as defined in the data collection sheet, are categorical (or nominal) variables. Frequency distributions will be reported for all the study objectives. Potential relationships between categorical variables will be analysed using contingency tables (either Fischer's exact or Chi-square tests); as an example, a contingency table would be used to determine whether an accurate admission weight is recorded significantly more often than an accurate discharge weight.

**E. Ethics**

Ethics has been approved by the Human Research Ethics Committee (Medical) , Protocol Ref No: M160920.

**F. Timing**

| | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|
| Literature review | | | | | | |
| Preparing protocol | | | | | | |
| Protocol assessment | | | | | | |
| Ethics application | | | | | | |
| Collecting data | | | | | | |
| Data Analysis | | | | | | |
| Writing up paper | | | | | | |

I have completed my exams and my registrar training time and currently focusing only on completing my MMed, so as to be registered as a Paediatrician with the HPCSA.

**G. Funding**

No funding is required for this project.

**H. Anticipated Problems**

No problems are anticipated at this time.

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**Appendices:**

**Data collection sheet** **Study ID number: _____**

**OBJECTIVE ONE**

**A. Patient Identifiers and Outcome:**

| | | | |
|---|---|---|---|
| a. | First Name | Complete | Incomplete |
| b. | Surname | Complete | Incomplete |
| c. | Gender | Complete | Incomplete |
| d. | Hospital number | Correct | Incorrect |
| e. | Date of birth | Complete | Incomplete |
| f. | Date of admission | Complete | Incomplete |
| g. | Date of discharge | Complete | Incomplete |
| h. | Outcome | Complete | Incomplete |

Notes:

For 'First Name', 'Surname', 'Gender' and 'Outcome', an incomplete code will be used if:

i. Handwriting is illegible (in cases of doubtful handwriting, 2 of 3 independent reviewers need to categorise handwriting as illegible). Minor spelling errors will be ignored
ii. Fields not filled in
iii. Writing indecipherable (light ink on carbon copy)

For 'Hospital Number', in addition to the above, an incorrect code will be used if:

i. Any one of the eight numerical digits are missing
ii. The number consists of more than eight numerical digits

For all 'Date' fields, in addition to the above, an incomplete code will be used if:

i. Any one of the day, month, or year fields is incomplete, missing or illegible

**B. Details of the doctor (including medical students) completing summary**

| | | | |
|---|---|---|---|
| i. | Name | Complete | Incomplete |
| j. | Signature | Present | Absent |
| k. | Date | Complete | Incomplete |
| l. | Hospital Unit | Recorded | Not recorded |

Notes:

For 'Name', an incomplete code will be used if:

i. Handwriting is illegible (in cases of doubtful handwriting, 2 of 3 independent reviewers need to categorise handwriting as illegible).

ii. Field not filled in

iii. Writing indecipherable (light ink on carbon copy)

For 'Date', in addition to the above, an incomplete code will be used if:

i. Any one of the day, month, or year fields is incomplete, missing or illegible

**C. HIV status of the child**

| | | | |
|---|---|---|---|
| m. | HIV exposure | Recorded | Not Recorded |
| n. | HIV Elisa result | Recorded | Not Recorded |
| o. | HIV PCR result | Recorded | Not Recorded |
| p. | CD4 count | Recorded | Not Recorded |
| q. | HIV viral load | Recorded | Not Recorded |

Notes:

For above fields, a 'Not recorded' code will be used if:

i. Field not filled in

ii. Writing indecipherable (light ink on carbon copy)

**D. Anthropometric status:**

| | | | | |
|---|---|---|---|---|
| r. | Admission weight | Accurate | Recorded Imprecisely | Not recorded |
| s. | Discharge weight | Accurate | Recorded Imprecisely | Not recorded |
| t. | Adm. length/height | Accurate | Recorded Imprecisely | Not recorded |
| u. | Nutritional oedema | Recorded | Not Recorded | |

Notes:

An accurate record must include documentation of the first numerical digit after the decimal point. 'Recorded Imprecisely' will be used if:

i. Handwriting is illegible (in cases of doubtful handwriting, 2 of 3 independent reviewers need to categorise handwriting as illegible).

ii. Writing indecipherable (light ink on carbon copy)

**OBJECTIVE TWO**

| | | | | |
|---|---|---|---|---|
| a. | Documented 'Lower Respiratory Tract Infection': | Yes | No | Unknown |
| b. | Correct ICD-10 for LRTI: | Yes | No | Unknown |

Notes:

The first numerical digit after the decimal point will not be essential for a 'Yes' code. An 'Unknown' code will be used if:

i. Handwriting is illegible (in cases of doubtful handwriting, 2 of 3 independent reviewers need to categorise handwriting as illegible).

ii. Writing indecipherable (light ink on carbon copy)

**OBJECTIVE THREE**

A. Follow-up Appointment at CHBAH: Yes No/ Not recorded

B. Follow-up Appointment at other health facility: Yes No/ Not recorded

C. Reason for Follow-up appointment at CHBAH

   a. For clinical assessment, specialised radiological or other investigative tests (e.g. EEG, Cardiac echocardiogram, etc.), or treatment (irrespective of any other reason for follow-up)

   b. For weight check only

   c. For laboratory result only

   d. For weight check and laboratory result only

   e. Reason not documented/ unclear/ illegible or indecipherable